

## **Can social neuromarketing be useful to public policy?**

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### **Abstract**

Some scholars (Craig Lefebvre & Flora, 1988) tried to apply the use of social marketing principles and techniques to an effective implementation of public health interventions, but in order to have an effective public health marketing communications, there is need of effective Public Service Announcements - that is, public social campaigns: in this frame, neuromarketing can be useful in building effective communication tools whose aim is sustaining social marketing, since it allows to understand the customers' innermost and unconscious insights with a scientific reliability. The research aim of the present study, therefore, is to fill a gap in the existing literature by verifying if and how neuroscience and neuromarketing tools can help national and local government in the implementation of more effective public campaigns. The methodology of the present explorative research provides a critical interpretive review of the literature (McDougall, 2015), regarding the social neuromarketing and the application of neuroscience and neuromarketing in the public policy, as well as a focus on the most relevant international case studies. The main results have highlighted the core mechanism of what can be called "social neuromarketing", in the frame of an original model created by adapting existing literature (Argawal, 2014), which has the following managerial as well as social implications: neuromarketing can align citizens' unconscious expectations towards welfare state, thus providing policy makers insights on how to create efficient public health communication. This implies that the discipline of neuromarketing has wide impact on many fields of the social sphere: finance, law, politics, education.

**Keywords: Public Service Announcements, neuromarketing, social marketing, advertising effectiveness, public health, communication, prevention, social campaign, public policy.**

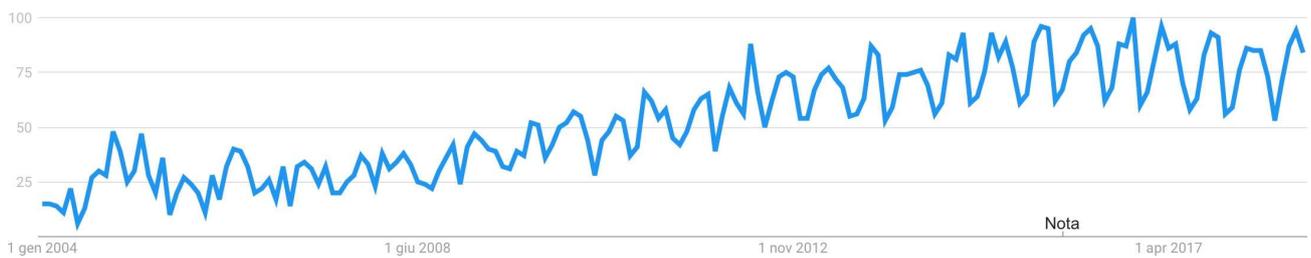
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### **1. Introduction**

Since the 2002 recognition of neuroeconomics at the Nobel Prize ceremony (in the person of Daniel Kahneman), neuroscience applied to the socio-economic fields (neuroeconomics, neurofinance and neuromarketing) have rapidly developed in consumer market applications, despite some criticisms of efficiency and ethics, described in detail by Fortunato *et al.* (2014), Fisher *et al.* (2010), Murphy *et al.* (2008). From 2004 to date, this is the current situation of the term "neuromarketing" in the web users' searches: as we can see from Figure 1, the trends are growing:

Figure 1. Neuromarketing popularity over the web from 2004 to date.



Source: Google trends

If compared to the broader category “marketing”, from Figure 2 it is possible to see that, in the last 5 years, the searches on the web have had exactly the same popularity:

Figure 2. Neuromarketing popularity on the web compared to marketing popularity in the last 5 years.



Source: Google trends

This could be interpreted like follows: neuromarketing has been almost totally identified with the marketing management, recently, in the majority of the Western world and part of Asia (see figure 3).

Figure 3. Comparison between the popularity worldwide of the neuromarketing and marketing terms on the web.



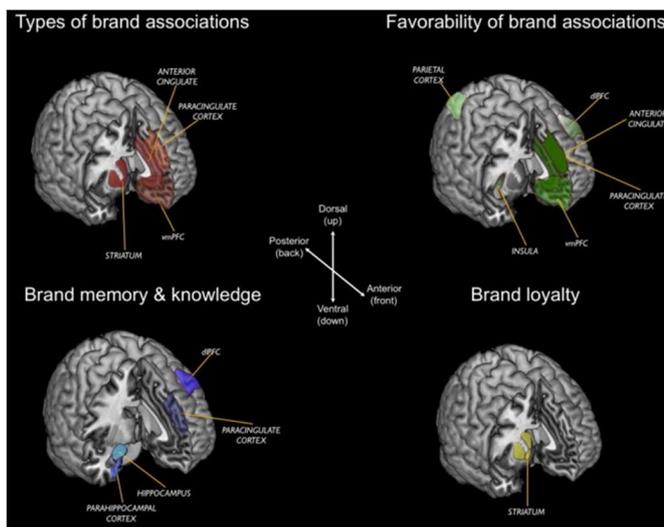


● neuromarketing ● marketing

Source: Google Trends

This happens because “Undoubtedly obtaining information from the neuro- marketing is more accurate ( than the classic marketing researches) since it takes into account not only the sociological and psychological profiles of customers, but also the cognitive. Thus, neuroscience gives us the ability to explore more of each group and segment the market on more solid bases. (...) Studies using neuro- imaging methodologies provide insight into real-time consumer response to a specific stimulus. The image of a brand can arouse emotions that can be more powerful than the effect of the product itself. *In other words a strong brand image alters perception towards the product.* Hence, the importance of knowing the underlying processes of customers in ways that enterprises develop valuable skills and resources to generate targeted strategies. The neuro-marketing provides a real competitive advantage in an increasingly saturated market” (Burgos-Campero & Vargas-Hernández, , 2013). Therefore, neuromarketing shows that there is a direct connection between the brain and brand associations, and explains it through scientific data, as Figure 4 shows:

Figure 4. Brain Regions Involved in brand information processing.



Source: Plassmann et al., 2012.

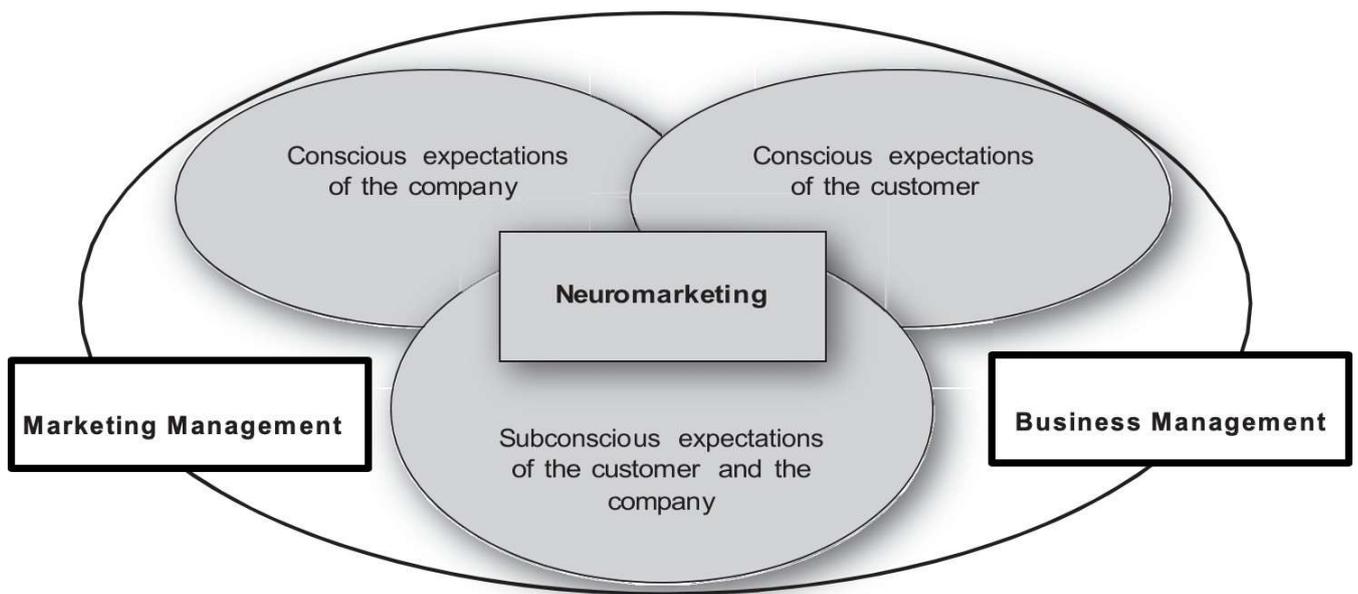
However, neuromarketing is not useful to the marketing discipline just for what regards branding, but it has been demonstrated (Agarwal, 2014) to be beneficial as a methodology in the following marketing inputs:

- Consumer Buying Behaviour
- Advertising
- Pricing
- New Product Development
- Distribution of Products
- Communication
- Product design

And, last but definitely most known, in the study of *Decision Making* (both consumers' and companies' decision processes). In fact, according to Agarwal (2014), "the role of marketing is not to decide but to provide insight for managers and operational staff so that they can make the right decisions and, in this sense, the benefit of neuroscience is that, by adapting this light to how the brain works, it helps transform lighting into conviction." This means that neuromarketing helps ensuring that managers do not extrapolate their subjectivity to the entire market. They begin to adopt a marketing attitude when they no longer consider themselves a representative sample of their customer base, regardless of their experience. Marketing professionals focus on listening to the customer rather than holding preconceived or subjective ideas. Thorough knowledge of how the brain comprehends and processes the information received from the environment helps them improve their objectivity. Rigorous and methodical marketing practitioners must also have a salesperson's temperament. They must be able to listen and understand their interlocutors and make themselves understood by adapting the way they think and speak to their interlocutors' communication patterns. This is true in particular when they have to work with engineers, financial personnel and IT people.

The use of neuroscience will help them realize what can instinctively guide these partners in their reactions. Neuroscience provides an interesting contribution, *as it gives additional insight*, sometimes different from declarations. This knowledge helps distinguish between the interlocutors' deep thoughts and conventional attitude or even doublespeak. It sheds light on the brain's stimuli that trigger, often subconsciously, the positive or negative reactions of internal partners and customers to the decision. In other words, neuromarketing helps aligning, with rigorous and scientific methods, the expectations of the demand and supply, thus providing more efficient and target-focused systems of the business and marketing management (see Figure 5).

Figure 5. The Neuromarketing Space between Marketing and Business.



Source: Agarwal, S. 2014

Since, according to Freemantle (1996), “close attention to the decision making behaviour of health professionals in situations of uncertainty indicates that this may not always be ‘rational’”, it is important to apply the neuroscientific methods to give rationality and rigor to policymakers’ decisions, so that they can rely on objective data.

## 2. Towards a social neuromarketing

With neuroscientific and neuromarketing knowledge increasingly being applied across multiple domains, it could be important to consider whether and how social important issues and policy can be promoted through social neuromarketing, such as public involvement in anti-drink / drive campaigns, etc.. It should be recognized that certain steps have been taken to tackle these issues: the French government, for example, has a special program called "Neuroscience and Public Policy", dedicated on how a better understanding of human behavior could help in developing more efficient public policies in health prevention, sustainable development, economics, finance, education, law and ethics – alongside improving well-being. Moreover, some universities have opened new joint programs such as those in Neuroscience and Public Policy, or Law and Neuroscience. Some scholars (Craig Lefebvre & Flora, 1988; Coffman, 2002; Varcoe, 2004; Bardus, 2011) have highlighted how social marketing – especially in the health programs - can be effective in attracting, retaining and engaging people, as they are said to be able to generate behavioral changes by stimulating interpersonal communication on the topic. In doing so, the neuromarketing tools help to better understand and interpret people responses (in terms of emotions, feelings, cognitive and behavioral reactions) in relation to social marketing stimuli, by applying neuroscience methods that are able to overcome research bias of the traditional techniques (i.e. questionnaire). This happens because - according to the behavioral economics - what we think or want has often little or no impact on our decision-making processes (Boksem & Smidts, 2015). Therefore, the scientific approach to the assessment of a marketing stimuli (via Functional Magnetic Resonance Imaging - fMRI, eye-tracking, Galvanic Skin Response - GSR, etc.), provides a more in-depth investigation of what happens in people's minds, outside their awareness. The application of neuroscience and neuromarketing tools

in Public campaigns could support national and local government to promote socially important issues and policies. In Italy, the theme of the application of a more human-based approach in the development of public policy is beginning to be debated in the literature but is still far from a practical implementation. In this frame, the research aim of the present study is to verify if and how neuroscience and neuromarketing tools can help national and local government in the implementation of more effective public campaigns. The methodology of the present explorative research provides a literature review regarding the social neuromarketing and the application of neuroscience and neuromarketing in the public policy, as well as a focus on the most relevant international case studies.

### **3. Background**

#### **3.1 Social marketing for behavioral change in the health programs**

Social responsibility is gaining its momentum in the formulation of the strategy of the organizations, at the organizational, behavioral and communicational level, and for many organizations it is even considered a key differentiator and a proximity element to customers, whom are increasingly sensitive to individual and collective well-being (Carrol & Shabanna, 2010). Yet, welfare is not the prerogative only of companies, but also of non-profit organizations, as well as, of course, institutions and local governments (Machado, Antunes & Miranda, 2015). Social marketing reflects “the use of marketing principles and techniques to influence a target audience to voluntarily accept, reject, modify, or abandon a behaviour for the benefit of individuals, groups or society as a whole” (Kotler, Roberto & Lee, 2002, p. 5). The concept of Social marketing, therefore, traces back to Philip Kotler, and arises precisely in the 1970s, when – together with Gerald Zaltman – the author realized that the same marketing principles that were being used to sell products to consumers could be used to sell also ideas, attitudes and behaviours. Kotler and Roberto (1989) and Andreasen (2012) define social/non-profit marketing as differing from other areas of marketing only with respect to the objectives of the marketer and his or her organization. Social marketing, in fact, seeks to influence social behaviors not to benefit the marketer, but to benefit the target audience and the general society. This technique has been used extensively in international health programs, especially for contraceptives and oral rehydration therapy (ORT) and is being used with more frequency in the United States for such diverse topics as drug abuse, heart disease and organ donation (Weinreich, 2018). Kotler & Zaltman (1971) ask themselves if marketing concepts and techniques can be effectively applied to the promotion of social objectives - such as brotherhood, safe driving, and family planning.

#### **3.2 Assessing the Social Marketing and PSAs Effectiveness**

Some scholars tried to apply the use of social marketing principles and techniques to an effective implementation of public health interventions: already in the latest 80s there was an article (Craig Lefebvre & Flora, 1988) discussing eight essential aspects of the social marketing process, that is:

- 1- the use of a consumer orientation to develop and market intervention techniques,
- 2- exchange theory as a model from which to conceptualize service delivery and program participation,
- 3- audience analysis and segmentation strategies,
4. the use of formative research in program design and pretesting of intervention materials,
- 5- channel analysis for devising distribution systems and promotional campaigns,
- 6- employment of the "marketing mix" concept in intervention planning and implementation,

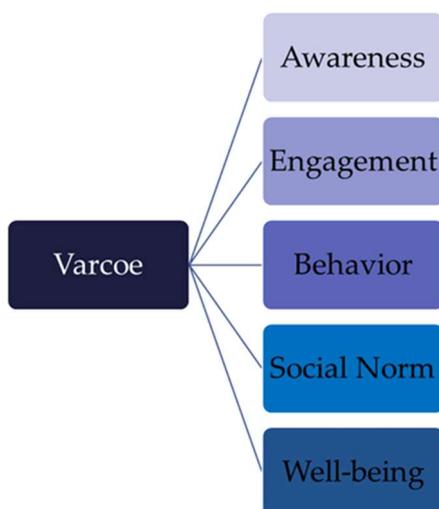
7- development of a process tracking system,

8- a management process of problem analysis, planning, implementation, feedback and control functions

The study suggests, in fact, that attention to such variables could result in more cost-effective programs that reach larger numbers of the target audience. Varcoe (2004), instead, provides a systematic way of proving the effectiveness of Social Marketing campaign, identifying five Key Performance Indicators (KPIs) or levels and associated indicators of success, needed for the evaluation of a campaign. A campaign is dependent on a success spanning all the levels of the following framework. (Figure 6). This means that:

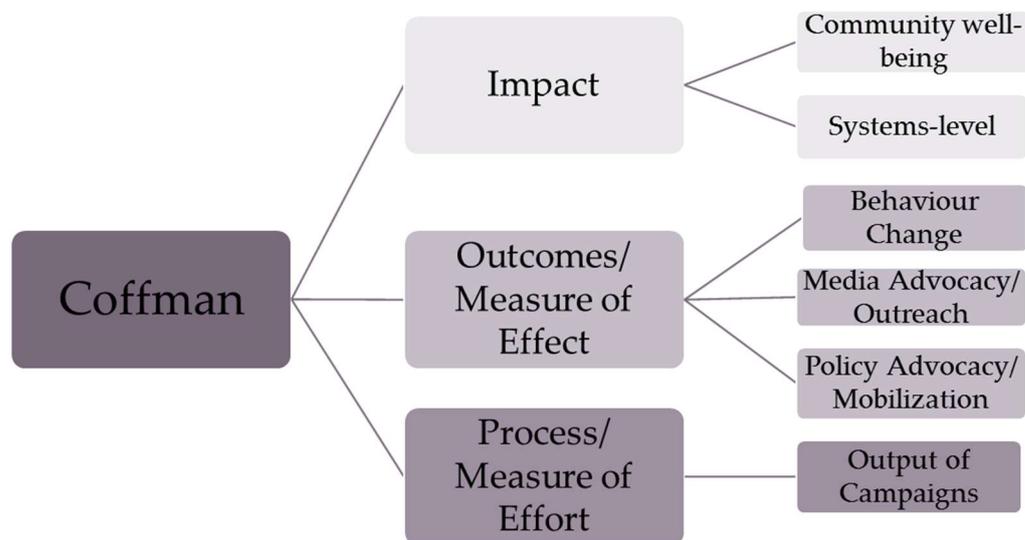
- failure at any level will undermine efforts to achieve subsequent levels;
- failure at later levels may be interpreted as weakness at the earlier levels, thus giving a powerful interpretation of the reasons for failure;
- however, early level effectiveness does not guarantee the later level of effectiveness;

Figure 6. Levels of Social Marketing effectiveness. Source: Varcoe (2004)



Coffman, (2002) instead, created the Logical Model Template, (Figure 7), which explores the Public Communication Campaigns by suggesting a framework to evaluate them.

Figure 7. Logical model Template.



Source: Coffman (2002)

#### 4. Methodology

The present study is an explorative research which adopted the model of the critical interpretive review: this, according to McDougall (2015) is “thoughtfully-designed and thorough, but not systematic in the sense of aiming to assemble every article relevant to the research question. A critical interpretive review is nonetheless a substantial research activity. The literature identified is a source of data that enables a specific research question to be answered; a body of knowledge is extended by the findings of this type of review”. A critical interpretive review aims at answering a research question (which, in this case, is whether social neuromarketing can be a useful tool in helping policymakers’ decisions) by reviewing normative and/or empirical literature – as this study does – from which the researchers identify key ideas.

The researchers chose a kind of methodological approach, for the literature of this study, typical of bioethics, given the interdisciplinary nature of this research and since this paper deals, to some extent, with bioethical issues (such as those involved in neuromarketing experiment, which use the data coming from the testers’ body signal): bioethics, in fact, are concerned with the ethical questions that arise in the relationships among life sciences, biotechnology, medicine and medical ethics, politics, law, theology and philosophy (Wynar, 2007).

#### **4.1 Main Results**

*“Neuromarketing as a tool to assess the effectiveness of the Public Service Announcements”.*

In Craig Lefebvre & Flora (1988) it is possible to note that one of the variables taken into account from the marketing discipline is the audience analysis – which is the main scope of neuromarketing methodologies applied to the assessment of the Public Service Announcements – that is the topic of this paragraph of our literature review.

There are studies that have highlighted the connection between social marketing and public policy, with reference to the tool of the Public Service Announcements (PSAs) used for the public health communications aims: according to Harris, Ciorciari & Gountas (2018), there are two types of public health communication strategies used to support individuals to change behavior: *preventing* or *implementing* an intervention.

A preventive communication strategy attempts to discourage individuals from undertaking harmful, risky or unhealthy behavior, such as taking up smoking, drugs, alcohol, binge drinking, gambling, speeding and driving under the influence of various substances. Traditional preventative approaches are primarily aimed towards individual behaviour change (Loss, Lindacher & Curbach, 2014). Public health marketing communications adopting a preventative approach are predominantly aimed at people who may be likely to consider or intend to engage in or continue certain risky behaviours, such as HIV prevention (Brescia, Caratù & Scaioli, 2019). The use of modern brain imaging techniques (typical of the neuroscience) could be useful to understand what brain areas are involved in the observation of video clips related to commercial advertising, as well as for the support of political campaigns, and also the areas of Public Service Announcements (Vecchiato et al., 2010).

Over the last decade, in fact, the emergence of Neuromarketing – as in, according to Lee et al (2007) “the field of study that employs methodologies of the neuroscience to understand the customer behaviour” – has advanced conventional marketing research, revealing how unconscious responses and emotions impact consumers’ perceptions and decision-making processes. Neuromarketing employs the concepts and techniques of *cognitive neuroscience*—that is, the investigation of the brain mechanisms underlying cognition. By concentrating on the neural substrates of psychological processes and their behavioural expressions, this new field of research seeks to formulate, implement, and evaluate marketing plans and actions. Neuromarketing is based on two postulations: first, that individual sensory and motor systems can be identified in specific networks of brain cells; and second, that observing these networks can reveal the unconscious or emotional characteristics of consumer decision making that conventional qualitative and quantitative research methods cannot (Mileti, Guido & Prete, 2016).

#### **5. Neuroscience: a tool for understanding the consumer’s response to ADV**

For companies, in order to plan an effective communication public communication, there is the need to understand the audience insights and their inner motivations at the basis of decision-making. This is possible thanks to the Consumer Neuroscience, which

allows to assess the effectiveness of advertising – among the other things – by understanding the inner insights of the audience thus, thanks to a process of reverse thinking, providing thus guidelines on how to build an effective advertising campaign. If transposed in the field of consumerism and according to the key literature mentioned in this chapter, neuromarketing can be useful in building effective communication tools whose aim is sustaining contemporary consumerism and social marketing, by understanding the customers' inner and unconscious insights with a scientific reliability. "Neuromarketing research provides new ways to contribute to these goals as it enhances traditional marketing instruments by drawing on innovative user-interfaces, applications and software. In the Neuromarketing long term, findings emanating from Neuromarketing might even change the interaction between humans and machines and lead to the development of new interfaces that facilitate direct communication between the human brain and an external device (Customer Experience: Neuro-marketing innovations, 2014). "The application of neuroscience to advertising issues has been widely hyped as well as criticised, sometimes under the titles of neuromarketing and neuroeconomics, but as yet few results have appeared in the literature. We began with Weilbacher's (2003) observation that practitioners preferred old myths to new understanding. Some prefer to believe that advertising directly persuades people to buy, and therefore advertising performance can be measured by sales, despite the logic to the effect that advertising, when it works at all, works by changing customer-based brand equity, which may affect behaviour but at a later date. Neuroscientists and advertisers need to work together so that research investigates how ads are processed, how the changed memories are stored and the subsequent changes in behaviour relative to the aspirations of the advertisers. In other words, they need to understand how brand equity is changed and how brand equity influences behavior" (Plassmann, H., Ambler, T., Braeutigam, S., & Kenning, P., 2007)

## 6. Discussion

Do people trust in neuroscience for social aims?

To be fair, Consumer Neuroscience (neuroscience applied to consumer studies, i.e. economics and marketing, even social marketing) is often considered as an unethical science (Gómez, 2015), but not totally: recently, public administrations have understood the importance of bio imaging techniques for improving the effectiveness of their public policies, especially in Europe, where neuroscience plays a big role in evaluating the quality of anti-smoking and anti-alcoholism Public Service Announcements: an example is the EU Horizon2020 project SmokeFreeBrain<sup>2</sup>, aimed at assessing – with neuro-metric indexes and techniques – the effectiveness of anti-smoking Public Service Announcements. In fact, "local governments are required to disseminate information concerning risks to public health and to promote messages that encourage healthier life style options to improve public health and reduce the huge burden placed on state spending from state subsidized health care in countries with social security systems such as Germany, the UK and France. In this context, Public

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<sup>2</sup> <http://smokefreebrain.eu>

Service Announcements (PSAs) are non- commercial advertisements intended to achieve attitudinal and behavioral changes in the general public (such as protecting the environment and safer driving). When effective, PSAs are of substantial benefit to public welfare, and the aim of the project is to improve their efficacy by using evaluation methods borrowed from applied neuroscience.<sup>3</sup>”

In this case, and other ones (as the MOTO project<sup>4</sup> and the STRESS project<sup>5</sup>, aimed at improving the performance of personnel in the air traffic control field), Social Marketing and Consumer Neuroscience help preventing deaths. Which was the same objective of the White House, when it launched the BRAIN Initiative (Brain Research through Advancing Innovative Neurotechnologies). The project is a collaborative, public-private research initiative announced by the Obama administration on April 2, 2013, with the goal of supporting the development and application of innovative technologies that can create a dynamic understanding of brain function. This activity is a Grand Challenge focused on revolutionizing our understanding of the human brain, and was developed by the White House Office of Science and Technology Policy (OSTP) as part of a broader White House Neuroscience Initiative. Inspired by the Human Genome Project, BRAIN aims to help researchers uncover the mysteries of brain disorders, such as Alzheimer's and Parkinson's diseases, depression, and traumatic brain injury.

As far as it concerns the assessment of HIV PSAs, also these are not new to neuroscientific assessments in order to provide future guidelines for the policymakers in producing effective Public Service Announcements: an example is the use of eye-tracking to assess the INPES poster “Stopping the use of the condom before having had an HIV test: don’t even consider it” was the subject of an eye-tracking study run” by the Mediamento Institute in 2008. “Heat maps were established showing the places where the visual attention of the participants was attracted most in terms of duration and number of times that they fixed their gaze on the poster. These tests show that the gaze of the participants was indeed attracted by the visual images but also by the text: all the participants have read the written message (Figures 8 and 9).

And more important, taking into consideration the number of ocular fixations and their duration, one can assume that the message was well memorized. The results of the study also show that time between the appearance of the poster on the eye- tracker screen and the first time the gaze of the participants was fixed on the text area is often smaller than for others areas, which suggests that the text catches their attention quickly, and thus that the INPES message was indeed transmitted. One can thus conclude that this campaign was well designed from the point of view of the balance between the emotion and the attention generated (...) Thus, a good message is judged by two main criteria: its capacity to draw attention and its capacity to be memorized. Cognitive theories put forward the importance of emotions. Moreover, methods in Cognitive Sciences offer a technological potential that can be mobilized for public health communication campaign assessment purposes.” (Oullier & Sauneron, 2010).

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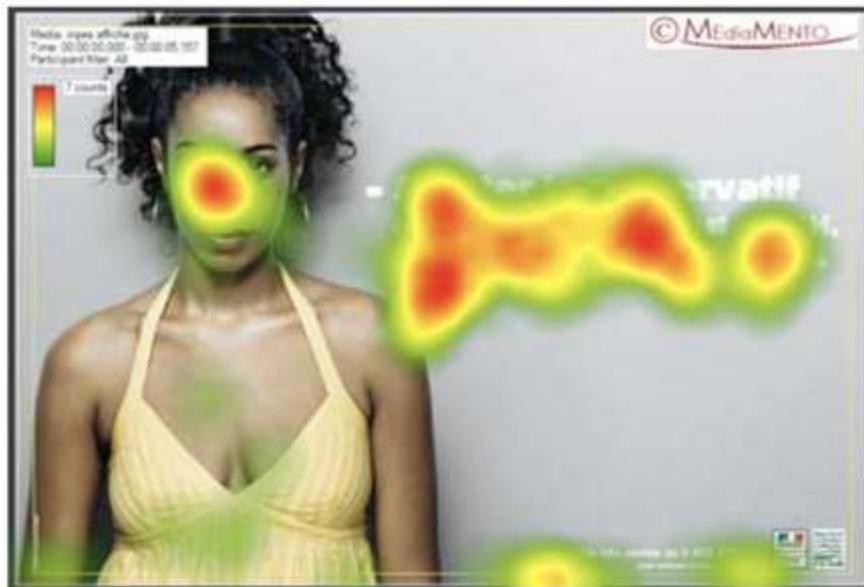
<sup>3</sup> <http://smokefreebrain.eu/public-service-announcement/>

<sup>4</sup> <http://www.moto-project.eu/>

<sup>5</sup> <http://www.stressproject.eu/>

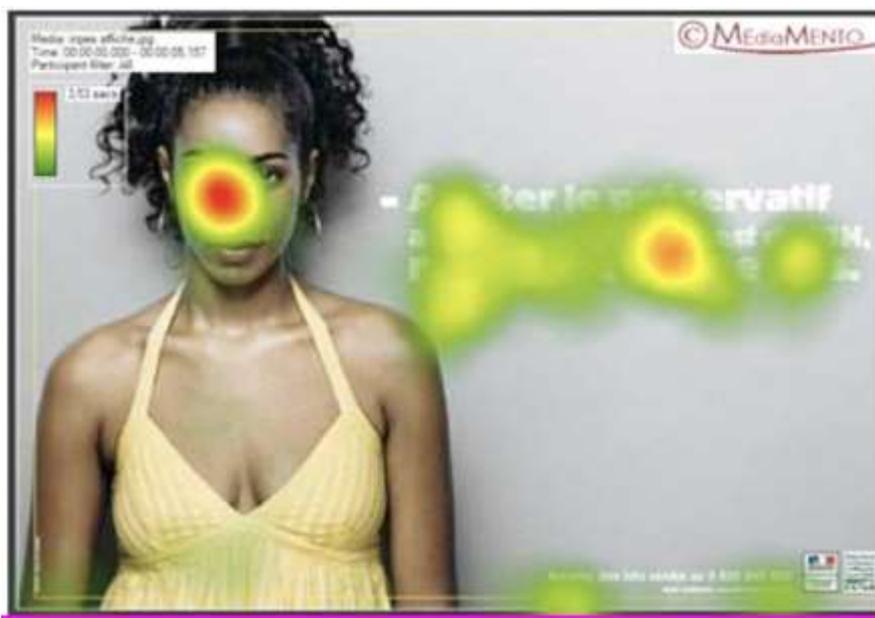
Figure 8 – Eyetracking heatmap of fixation duration for an INPES posting campaign.

The red areas show particularly high focus of attention.



Source: Mediamento 2018

Figure 9. Eyetracking heatmap of fixation duration for an INPES posting campaign. The red areas show particularly longer focus of attention.



Source: Mediamento 2018

So, research data in Consumer Neuroscience is gathered with cutting-edge technologies and devices which by monitor biometric signals and provide neuroscientific indexes, such as:

- Eye tracking: eye trackers are small cameras that can track eye movement and eye focus, helping researchers understand which parts of an advertisement are most visually

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appealing to test subjects. Eye-tracking is the process of measuring either the point of gaze (where one is looking) or the motion of an eye relative to the head. An eye tracker is a device for measuring eye positions and eye movement, and is used in research on the visual system, in psychology, in psycholinguistics, marketing (as an input device for human computer interaction) and in product design. In recent years, the increased sophistication and accessibility of eye tracking technologies have generated a great deal of interest in the commercial sector. Applications include web usability, advertising, sponsorship, package design and automotive engineering. In general, commercial eye tracking studies function by presenting a target stimulus to a sample of consumers while an eye tracker is used to record the activity of the eye. Examples of target stimuli may include website, television programs, sporting events, films, commercial, magazines, newspapers, packages, shelf displays, consumer systems (ATMs, checkout systems, kiosks), and software. The resulting data can be statistically analyzed and graphically rendered to provide evidence of specific visual patterns. By examining fixations, saccades, pupil dilation, blinks and a variety of other behaviors researchers can determine a great deal about the effectiveness of a given medium or product.

Facial coding: subjects' facial expressions are analyzed to learn more about certain responses to a product or advertisement, including frustration, happiness, and more.

Galvanic skin response and electrodermal activity: GSR, also named Electrodermal Activity (EDA) and Skin Conductance (SC), is the measure of the continuous variations in the electrical characteristics of the skin, for instance the conductance, caused by the variation of the human body sweating. The traditional theory of the GSR analysis is based on the assumption that skin resistance varies with the state of sweat glands in the skin. Human body sweating is regulated by the Autonomic Nervous System (ANS). In particular, if the sympathetic branch (SNS) of the autonomic nervous system is highly aroused, then sweat gland activity also increases, which in turn increases skin conductance, and viceversa. In this way, skin conductance can be a measure of the human Sympathetic Nervous System responses. Such system is directly involved in the emotional behavioral regulation in the humans. Additional studies highlighted the relationship between GSR signal and some mental states, such as stress, drowsiness and engagement. To record the GSR signal, in general just two electrodes put at the second and third finger of one hand are necessary. The variation of a low-voltage applied current between the two electrodes is used as measure of the EDA. Recently, new commercial healthcare devices more and more wearable and fancy (bracelets, watches) have been developed, thus such measure is usable in each research activity in the neuroscience domain also in no-laboratory settings.

- Electroencephalography (EEG)— It is an electrophysiological monitoring method to record electrical activity of the brain. It is typically noninvasive, with the electrodes placed over the scalp, thus suitable also for no-laboratory settings. Each conscious and unconscious mental function is the result of the electrical communication among the human brain neurons. It is not possible to record in a non-invasive way the electrical activity related to each neuron, however the EEG technique is able to measure the voltage fluctuations over the scalp caused by the concomitant electrical activity of a neurons population. Such voltage fluctuations could be characterized in terms of spectral content (EEG rhythms or bands) or of time-domain characteristics (Evoked

Potentials and Event-Related Potentials). The brain's spontaneous electrical activity (popularly called "brain waves") of a particular brain area in a particular band could be associated to specific cognitive processes (e.g. memorization, decision-making,...) and mental states (e.g. workload, fatigue, drowsiness, ...). The Evoked Potentials (EP) analysis consists in averaging the EEG activity time-locked to the presentation of a stimulus of some sort (visual, somatosensory, or auditory). Event-related potentials (ERPs) refer to averaged EEG responses that are time-locked to more complex processing of stimuli. EEG is often used to diagnose epilepsy, which causes abnormalities in EEG waves. It is also used to diagnose sleep disorders, coma, encephalopathy, and brain death. In general, EEG is used to be a first-line method in clinical applications about the human brain, because it is not dangerous for the patient, unlike the Computer Tomography (CT); it is moreover relatively inexpensive and non-bulky, if compared to the Magnetic Resonance Imaging (MRI), and has a greater time resolution (milliseconds), which is not possible to reach, instead with a CT or an MRI. Beyond clinical application, thanks to its advantages, the EEG technique is widely used in neuroscience, cognitive psychology, psychophysiological and neuro-ergonomics research.

MRI- that makes an anatomic representation of the brain by making use of magnets: an MRI scanner is used to measure the blood oxygen level, which can give an indication of increased brain activity in certain regions.

fMRI: (a sub area of MRI, and also the latest and most popular brain imaging method in the field of neuromarketing used for investigation of brain activation differences); the f stands for 'functional', indicating that it is a "process" instead of a snapshot (like in the MRI) being observed.

In our brain, the neuronal activity constantly fluctuates as we engage in different activities, from simple tasks – like controlling one hand or reach out and pick up a cup of coffee, to complex cognitive activities, like understanding language in a conversation. The brain also has many specialized parts, so that activities involving vision, hearing, touch, language, memory, etc. have different patterns of activity. Even when one rests quietly with his/her eyes closed, the brain is still highly active, and the patterns of activity in this resting state are thought to reveal particular networks of areas that often act together. Functional magnetic resonance imaging (fMRI) is a technique for measuring and mapping brain activity that is non- invasive and safe. It is being used in many studies to better understand how the healthy brain works, and in a growing number of studies it is being applied to understand how that normal function is disrupted in disease. Simply speaking, it displays the blood flow of oxygen-rich blood to different regions in the brain in order to explore the human behavior.

-Respiration and heart rate (HR). This system is based on measurement of beating speed of the heart and respiration speed using sensors placed on the chest or by means of a finger pulse meter. It has been found that when attention increases, the heartbeat slows down. Fast and profound breathing is connected with energy and excitement and shallow breathing can demonstrate concentration, tense anticipation, or panic and fear. This can provide a useful indication of physical excitement.

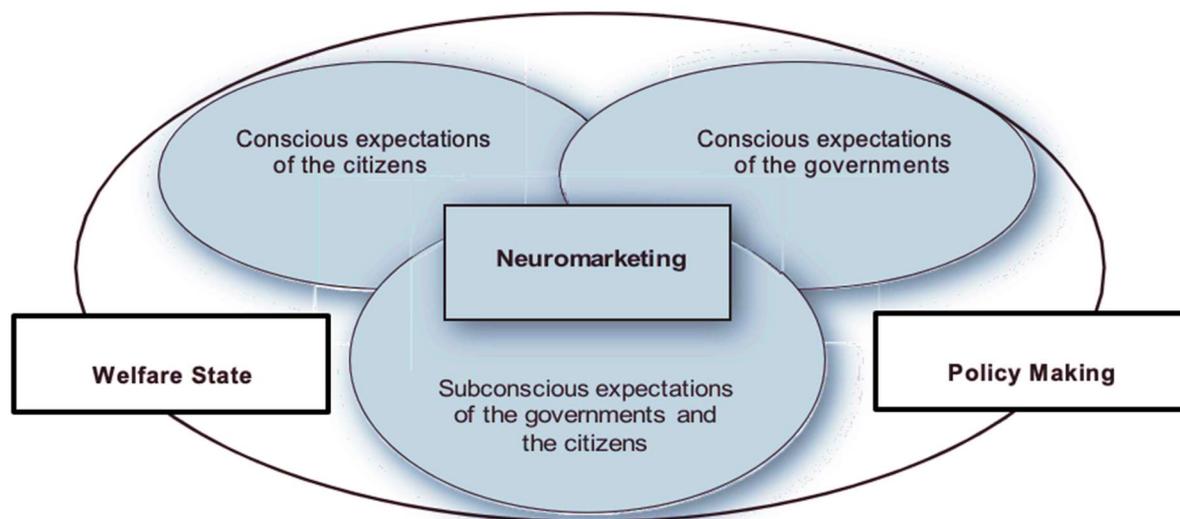
## 7. Conclusions

For what regards public policies, it is already known that “neuroeconomics, behavioural economics and picoeconomics have recently come to widespread popular attention, informing both public policy and commercial applications in UK and USA in particular. From neuroeducation and neuromarketing to so-called ‘nudge’-inspired public policies, the resurgence of broadly behavioural accounts of economic theory has far-reaching consequences for how we both understand and intervene in human rationality” (Pykett, J., 2012). It is well known, in fact, the importance for policy-makers of communicating social messages through Public Service Announcements, and their interests in evaluating their efficacy with neuroscientific methods: the reasons – explained so far in this study – are even been recognized by centres of Strategic Analysis of the European governments (i.e. the French *Centre d'analyse stratégique*), which declare how “a good message is judged by two main criteria: its capacity to draw attention and its capacity to be memorized. Cognitive theories put forward the importance of emotions. Moreover, methods in Cognitive Sciences offer a technological potential that can be mobilized for public health communication campaign assessment purposes.” (Oullier & Sauneron, 2010). In this sense, the model drawn in the introduction can be applied to the social sphere too.

A good social marketing message can be assessed by studying the unconscious reactions of the audience to the stimulus: the meanings and advantages offered by the neuromarketing perspective lie in the fact that it offers a direct window on the insights that guide people towards a specific direction of choice, difficult to capture through surveys and conventional methodologies, such as the use of questionnaires or the realization of psychological interviews. Even in the public field, the analytical perspectives of cognitive psychology and neuroscience, offer interesting insights on the effectiveness and how improve channels and the campaign design in order to affect people changing behaviour and community well-being.

We could therefore say that, by helping policy-makers in their decision-making process (in providing accurate and scientific-based data regarding the PSAs’ audience expectations about the Social and Welfare Policies and Services), neuromarketing can align the conscious expectations of both (citizens’ and governments’) with their unconscious expectations, thus providing a more targeted policy-making in the context of a more efficient welfare state (see figure 10).

Figure 10. The Neuromarketing Space in the social sphere.



Source: own elaboration, adapted from Agarwal, 2014

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